CHAPTER 12: WHAT DID WE LEARN ABOUT AIRCRAFT STORAGE CAPACITY?

Why is Aircraft Storage Capacity Important to Washington State?

Many of the aircraft based throughout Washington State are used for business purposes in the local community, on a regional, statewide, and even national level. These aircraft provide emergency medical transportation, firefighting capabilities, search and rescue support, a mode of transportation for businesses people to access many communities, deliveries of time sensitive materials, and many other services. In order to have access and to make efficient use of the system, these aircraft must be stored in a location that is both safe and convenient when they are not in use. This in turn requires aircraft storage at airports across Washington State.

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There are generally two types of storage available at airports: tiedowns and hangars. The decision to utilize either a hangar location or tiedown location is often due to personal preference. Hangar facilities provide an added level of security and protection from the weather versus the use of a tiedown position. Larger hangar facilities are often used by corporate aviation to provide a location where they will base their aircraft, conduct business, co-locate additional company services, and provide the regularly scheduled maintenance for their aircraft. Companies that have corporate aviation facilities at one airport in the state will then have access to many of the smaller communities throughout the state that also have an airport. This allows companies to conduct their business in a more efficient manner, which is often a reason companies choose to conduct business in a particular community.

There is a substantial need for transient storage positions to accommodate visiting aircraft.

In addition to providing locations for based aircraft at Washington State airports, there is a substantial need for transient storage positions to accommodate visiting aircraft at these same airports. When aircraft move from one airport to another in the course of completing business in the various communities, maintaining a location where they are able to park for several hours or multiple days is essential for support to aviation users and future airport development.

What Is The Current Status of Aircraft Storage Capacity?

In 2005, the airport system as a whole had reached 83 percent of its existing aircraft storage capacity.

The existing aircraft storage capacity is comprised of both hangar buildings and aircraft tiedown positions at the public use airports located in Washington State. As of 2005, aircraft storage capacity in Washington State totaled 9,772 positions, of which 4,503 were aircraft tiedown positions, and 5,314 were hangar units. Since there was a total of 7,962 aircraft based in the state in 2005, the airport system as a whole had reached 83 percent of its existing aircraft storage capacity. In fact, 4 of the state's 14 RTPOs have either exceeded or were approaching their existing based aircraft storage capacity.

Based on anecdotal information received from airport managers, pilots, and airport operators, most pilots and aircraft owners in Washington prefer secure, weather-proof storage facilities (i.e. hangar units). As such, the actual demand for hangar facilities is far greater than demand for aircraft tiedown positions. At most of the airports across the state, the hangar facilities are fully utilized and there is still pent up demand for additional hangar buildings. Many airports in the state, especially in the Puget Sound Region, are experiencing a large number of requests to have land leased from the airport to build hangar facilities. This desire for additional hangar facilities is also reiterated by reviewing the available hangar waiting lists reported during the database update completed as part of LATS Phase I in the summer of 2006. Airport managers reported a total of 686 people on waiting lists at airports across the state. Additionally, of the 4,503 aircraft tiedowns available in Washington State, 29 percent are currently designated for transient aircraft usage.

The current system capacity and system demand of aircraft storage positions is provided in Figure 172, summarized by RTPO.

Figure 172: 2005 Aircraft Storage Demand versus Capacity by RTPO

RTPO	Total Demand	Total Capacity	% Utilization
Benton-Franklin- Walla Walla	467	652	72%
Northeast Washington RTPO	61	96	64%
North Central Washington RTPO	403	515	78%
Palouse RTPO	111	144	77%
Peninsula RTPO	339	527	64%
Puget Sound Regional Council	3691	4373	84%
Quad County RTPO	406	489	83%
Skagit/Island MPO	299	418	72%
Spokane Regional Transportation Council	541	566	93%
Southwest Washington Regional Transportation Council	448	752	60%
Southwest Washington RTPO	344	405	85%
Thusrton Regional Planning Council	198	186	106%
Whatcom Council of Governments	244	266	92%
Yakima Valley Council of Governments	166	245	68%
Airports not in RTPO	251	243	103%
Statewide Total	**7969**	**9552**	**83%**

Figure 173 presents the 2005 number of aircraft storage positions by RTPO, while Figure 174 depicts the percentage of total 2005 aircraft storage capacity in each RTPO. As shown, the Puget Sound Regional Council RTPO accounts for nearly half of the 2005 statewide aircraft storage capacity

Figure 173: Bar Graph – 2005 Demand versus Capacity by RTPO

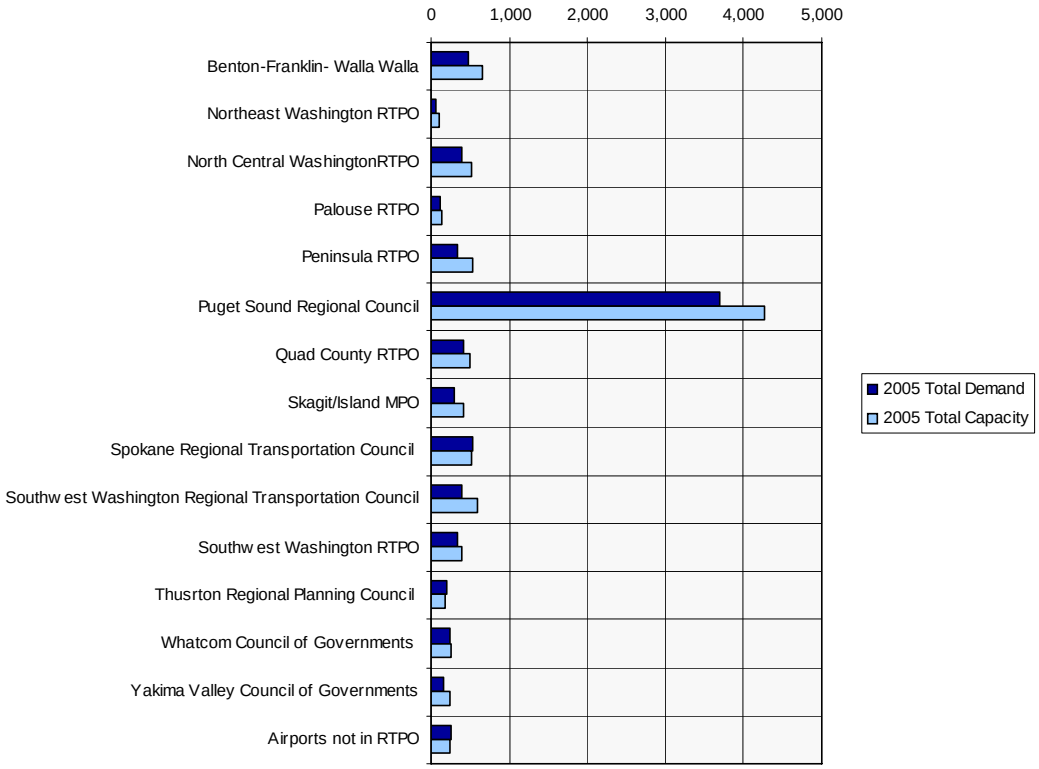
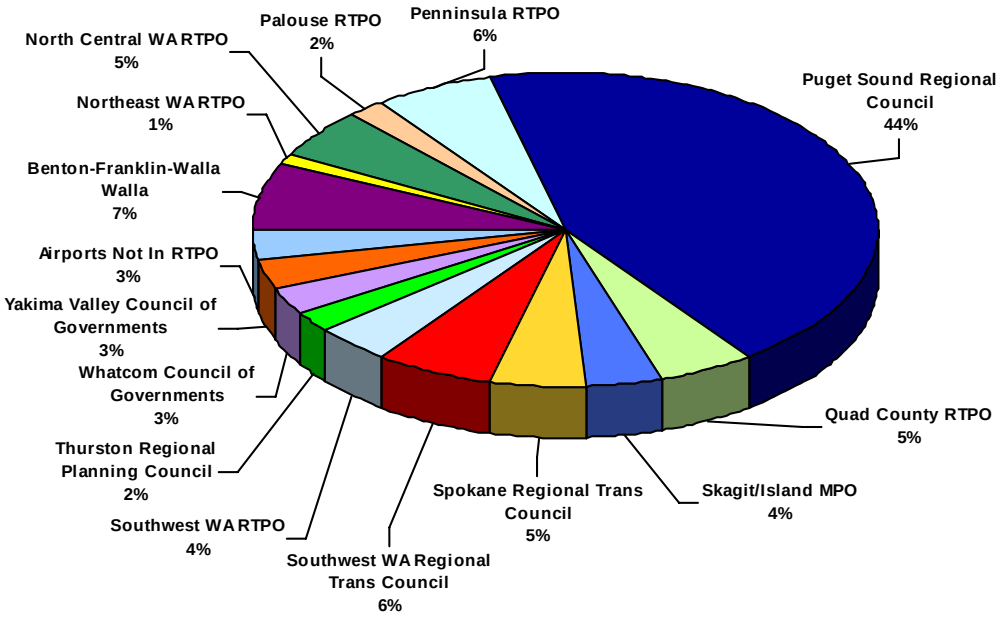


Figure 174: 2005 Aircraft Storage Capacity by RTPO



What Was the Scope of Our Analysis?

Aircraft storage demand and capacity projections were developed for all airports within Washington State. As documented earlier in this report, the demand forecasts for based aircraft at both commercial services and general aviation facilities were completed for the years 2005, 2010, 2015, 2020, and 2030. For the purpose of this study, the aircraft storage capacity projections were completed for the years 2015 and 2030.

The existing aircraft storage capacity was calculated and reported during the Phase I effort and a summary was provided earlier in this chapter. The analysis focused on the estimated future aircraft storage capacity for all public use airports in Washington State. The aircraft storage capacity is comprised of four storage options: a based aircraft tiedown position, a transient aircraft tiedown position, a small hangar building, and a large hangar building.

Future capacity was determined as a function of the projected demand

The projected capacity to accommodate the forecast demand at each airport was calculated and then this demand was programmed to fit into one of the aircraft storage capacities listed above. As such, the future capacity was determined as a function of the projected demand, rather than providing a purely random association of tiedowns versus hangars,

and small hangars versus large hangars. In addition, no land acquisition transactions were assumed to be accomplished in the planning period to accommodate additional future aircraft storage facilities.

What Was the Forecast Methodology?

In order to determine future aircraft storage capacity, this analysis determined if an individual airport had the potential to accommodate additional aircraft storage positions.

Airports typically develop aircraft storage positions on an as-needed basis, therefore, it was not expected that this analysis would reveal unused storage positions adequate to accommodate 2030 demand. In order to determine future aircraft storage capacity, this analysis determined if an individual airport had the potential to accommodate additional aircraft storage positions. This potential was measured by estimating the amount of developable land available at each airport and estimating the number of aircraft storage positions that could be accommodated on that land.

These estimates and assumptions were made to facilitate the analysis. However, it is recognized that other types of facility development such as airfield operations facilities, air cargo processing facilities, terminal facilities and others also compete for available land. Many airports may ultimately choose to develop their land for purposes other than aircraft storage facilities. Considering this, the completed analysis may be somewhat optimistic. It does, however, provide a system-level representation of the aircraft storage capacity issues facing the State throughout the next 25 years.

The process to develop the future aircraft storage capacity required a series of assumptions and calculations to develop the final capacity numbers. The key assumptions and key calculation steps are presented in the paragraphs below. The full analysis with assumptions and methodology can be found in the technical memorandum on aircraft storage located in the appendix.

Assumptions:

These assumptions were developed based on generally accepted planning guidelines that have been used throughout the United States. As is consistent with all system planning studies, specific details for individual airports were not analyzed, therefore some assumptions may not meet a specific airport precisely. These assumptions will produce good planning level numbers across the system as a whole.

Several of our key assumptions are bulleted in the paragraphs below.

- No airports now open to the public will close in the future.

- For each airport, existing and projected based aircraft are identified by aircraft type and hangar size requirements are based on these types.
- Demand was calculated for each type of aircraft storage facility (i.e., small hangars, large hangars, based aircraft tiedowns, and transient aircraft tiedowns) by applying the following scenarios to each individual airport:
- 80 percent of all based aircraft in the single-engine and other category will be stored in small hangars.
- 80 percent of all based aircraft in the multi-engine, jet and rotor categories will be stored in large hangars.
- 20 percent of based aircraft will be stored in tiedown positions.
- Transient aircraft tiedown positions were calculated using a ratio of 25 percent of total based aircraft.
- For the future airport capacity, the amount of developable land available was considered with the following assumptions:
- Developable land was calculated utilizing both the airport's Airport Layout Plan (ALP) drawing and the undeveloped land area provided by airport managers during the database update in 2006.
- The following ratios were used to calculate the space requirements for aircraft at individual airports:
- A ratio of eight aircraft per acre was used for small hangar buildings and aircraft tiedown positions.
- A ratio of four aircraft per acre was used for large hangar buildings.
- No loss of existing hangar capacity was assumed other than what is specified on individual ALPs.
- For airports within the Recreation or Remote category, any land identified as available for development was used only to accommodate the demand projected for that airport; any additional developable land was not considered available for regional demand purposes.
- The FAA has designated reliever airports for Spokane International and Sea-Tac International Airports. The reliever airports are nearby facilities that attract general aviation activity in order to reduce congestion of air traffic at the larger airports. Considering this, at Sea-Tac, it has been assumed that any land available for development will

be used for other purposes rather than general aviation aircraft storage. On the other hand, Spokane International serves commercial airlines and general aviation aircraft. Similarly to the assumption applied to airports in the Recreation or Remote category, any land identified as available for development at Spokane International was used only to accommodate the demand projected for the airport; any additional developable land was not considered available for regional demand purposes.

Methodology:

Several steps were completed in order to compare demand and capacity for aircraft storage facilities in Washington State. Each step built upon the prior step. The methodology used is outlined below:

- Step 1**:** Calculate 2015 and 2030 aircraft storage demand

- Projected demand for aircraft storage facilities was derived by applying the assumptions listed above to the based aircraft projections.

- Step 2: Calculate 2015 and 2030 aircraft storage capacity

Projected capacity for aircraft storage facilities was derived through various steps including determining the total acreage of developable land available at each airport, and determining the percentage of small versus large aircraft projected to use each airport. The assumptions discussed above were applied in order to determine how much land each type of aircraft would need.

- Step 3: Compare projected demand and capacity.

By comparing the demand projections to the capacity projections, excess and constrained capacities were identified for each airport for the years 2015 and 2030.

- Step 4: Summarize Results

With the calculations of the forecast demand and the future capacity for aircraft storage facilities, each airport, RTPO, special emphasis region, and statewide analysis could be reviewed. The shortfalls in capacity by airport, RTPO, and special emphasis region are readily understood and presented.

What Are The Aircraft Storage Analysis Results?

There are several individual airports throughout the state which are expected to have aircraft storage capacity shortfalls.

The first results to review are the overview of the statewide demand and capacity calculations. As a whole, the Washington State airport system is expected to be 29 percent and 36 percent utilized in terms of aircraft storage facilities by 2015 and 2030, respectively. While this indicates that the entire system is projected to have adequate long-term aircraft storage capacity, there are several individual airports throughout the state which are expected to have aircraft storage capacity shortfalls, as shown in Figure 175.

The second results to review are the special emphasis regions demand and capacity calculations. Figure 176 presents the total demand and the total capacity, and percentage utilization by special emphasis region for the years 2015 and 2030. This information provides a summary of the four special emphasis region's anticipated demand for aircraft storage facilities along with the potential capacity to accommodate the demand. It also presents the utilization by special emphasis region to understand how constrained the various regions are across the state.

In terms of aircraft storage facilities, it is expected that the all four special emphasis regions combined will be 52 percent utilized by 2015 and 64 percent utilized by 2030. The Southwest Washington and the Spokane regions are projected to have the least amount of capacity relative to the forecast demand. The Tri-Cities region is projected to have the largest amount of aircraft storage capacity relative to the forecast demand.

Figure 175: Statewide Aircraft Storage Capacity Shortfalls, in number of storage positions

Airport	2030 Demand	2005 Capacity	Estimated Future Additional Capacity	Total 2030 Capacity	Shortfall
Boeing Field/King Count International	1,410	479	-15	464	-946
Sanderson Field	219	21	0	21	-198
Felts Field	565	310	84	394	-171
Kenmore Air Harbor, Inc.	138	0	0	0	-138
Crest Airpark	451	325	0	325	-126
Pearson Field	281	154	26	180	-101
Orcas Island	200	101	0	101	-99
Colville Municipal	111	20	0	20	-91
Western Airpark	79	0	0	0	-79
Chelan Municipal	115	51	0	51	-64
Goheen Field	141	87	0	87	-54
Cashmere-Dryden	88	43	0	43	-45
Renton Municipal	436	290	107	397	-39
Goldendale Municipal	51	16	0	16	-35
Lynden Municipal	49	15	0	15	-34
Whidbey Airpark	33	0	0	0	-33
Firstair Field	105	87	0	87	-18
Forks Municipal	30	17	0	17	-13
Port of Whitman Business Air Center	105	11	83	94	-11
Sea-Tac International	15	4	0	4	-11
Davenport Municipal	31	21	0	21	-10
Vashon Municipal	60	50	0	50	-10
Wilbur Municipal	23	20	-7	13	-10
Sequim Valley	41	35	0	35	-6
Tonasket Municipal	18	12	0	12	-6
Blaine Municipal	49	35	9	44	-5
Sky Harbor	5	0	0	0	-5
Willapa Harbor	5	0	0	0	-5
Packwood	6	2	0	2	-4
Swanson Field	25	21	0	21	-4
Woodland State	23	20	0	20	-3
Lost River Resort	3	1	0	1	-2
Sunnyside Municipal	16	14	0	14	-2
Cross Winds	3	2	0	2	-1
Methow Valley	20	19	0	19	-1
Seattle Seaplanes	4	3	0	3	-1

As shown in Figure 176, the Spokane and SW Washington regions will be at 98 percent and 99 percent, respectively, of their 2030 capacity. The Puget Sound region is expected to be at 80 percent of its capacity by 2030. The Tri-Cities region is expected to have the least utilization at 13 percent.

Figure 176: Washington State Special Emphasis Region Demand versus Capacity

Region Name	2015			2030		
	Total Demand	Total Capacity	% Utilization	Total Demand	Total Capacity	% Utilization
Puget Sound Region	5,572	8,701	64%	6,798	8,550	80%
Spokane Region	844	958	88%	961	985	98%
SW Washington Region	614	778	79%	771	777	99%
Tri-Cities Region	412	3,818	11%	495	3,801	13%
Total Special Emphasis Region Demand vs. Capacity	**7,442**	**14,255**	**52%**	**9,025**	**14,113**	**64%**

2015 and 2030 total demand and total capacity for each special emphasis region is depicted graphically in Figures 177 and 178.

Figure 177: Bar Graph – 2015 Demand versus Capacity by Special Emphasis Region

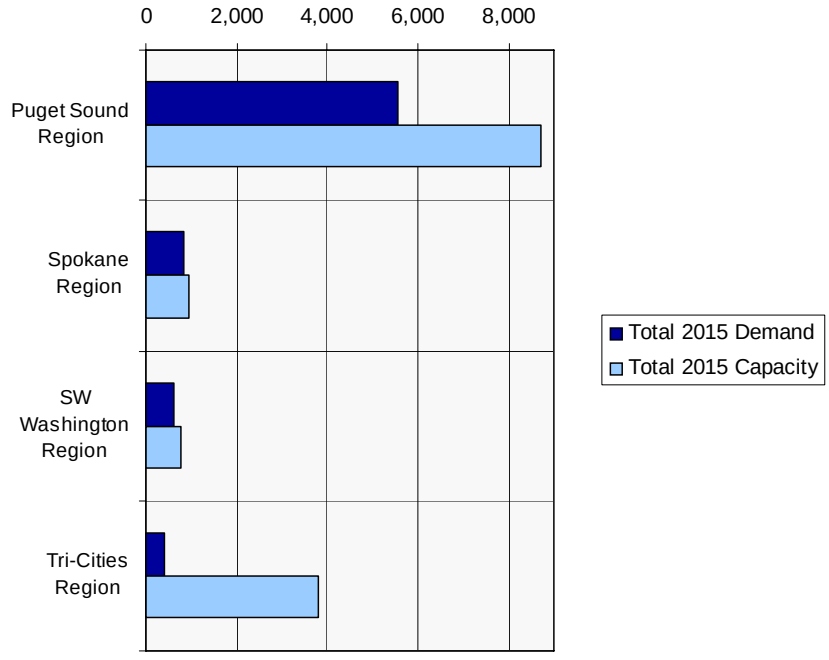


Figure 178: Bar Graph – 2030 Demand versus Capacity by Special Emphasis Region

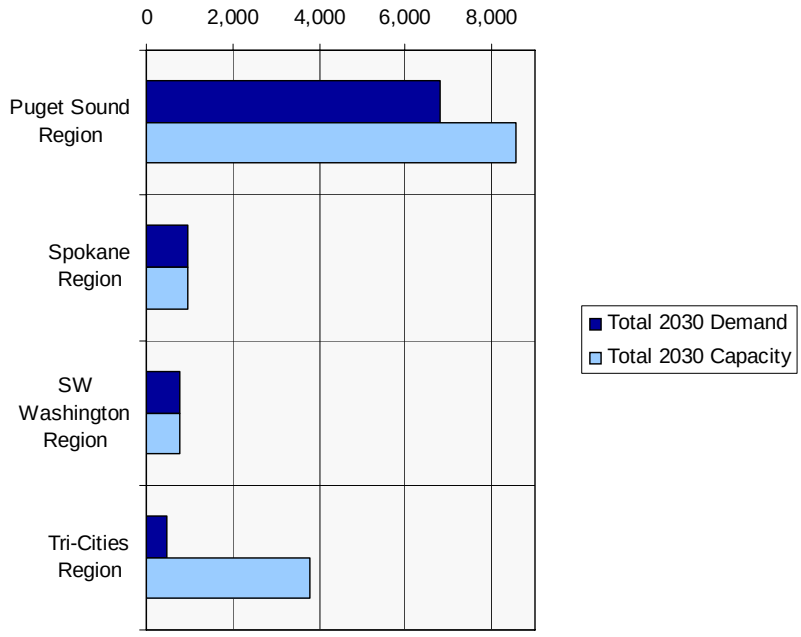


Figure 179 presents the total demand and the total capacity, and percentage utilization by RTPO for the years 2015 and 2030. Similarly to Figure 180, this information provides a summary of the 15 RTPO's anticipated demand for aircraft storage facilities along with the potential capacity to accommodate the demand. It also presents the utilization percentage by RTPO.

Figure 179: Washington State RTPO Demand versus Capacity

RTPO	2015			2030		
	Total Demand	Total Capacity	% Utilization	Total Demand	Total Capacity	% Utilization
Benton-Franklin-Walla Walla RTPO	694	7,054	10%	840	7,008	12%
Northeast Washington RTPO	100	808	12%	117	804	15%
North Central RTPO	609	1,623	38%	726	1,604	45%
Palouse RTPO	149	817	18%	168	805	21%
Peninsula RTPO	558	2,562	22%	683	2,519	27%
Puget Sound Regional Council	5,572	8,701	64%	6,798	8,550	80%
Quad-County RTPO	670	8,844	8%	826	8,723	9%
Skagit/Island RTPO	498	3,180	16%	561	3,153	18%
Spokane Regional Transportation Council	844	958	88%	961	985	98%
Southwest Washington Regional Transportation Council	584	1,254	47%	765	1,240	62%
Southwest Washington RTPO	474	1,358	35%	539	1,337	40%
Thurston Regional Planning Council	423	2,024	21%	534	1,880	28%
Whatcom Council of Governments	385	789	49%	473	753	63%
Yakima Valley Council of Governments	193	529	36%	217	520	42%
Airports not in RTPO	397	758	52%	503	752	67%
Total Statewide Demand vs. Capacity	**12,150**	**41,259**	**29%**	**14,711**	**40,633**	**36%**

The RTPOs that are projected to have the least amount of capacity relative to the forecast demand: Puget Sound Regional Council, Spokane Regional Transportation Council, Southwest Washington Regional Transportation Council, Whatcom Council of Governments, and San Juan County airports not included in an RTPO.

The RTPOs projected to have the largest amount of aircraft storage capacity relative to the forecast demand are: Benton-Franklin-Walla Walla RTPO, Northeast Washington RTPO, Palouse RTPO, Peninsula RTPO, Quad County RTPO, Skagit/Island RTPO, and Thurston Regional Planning Council.

As shown in Figure 180, the Spokane Regional Transportation Council RTPO is expected to be at 88 percent of capacity by 2015 and 98 percent of capacity by 2030. The Puget Sound Regional Council RTPO is

projected to be the second highest utilized RTPO with 64 percent of its capacity being used by 2015 and 80 percent of its capacity being used by 2030. The Quad County RTPO is expected to have the least utilization at 9 percent followed closely by Benton-Franklin-Walla-Walla RTPO at 12 percent.

Figures 180 and 181 graphically depict total demand and total capacity by RTPO for the years 2015 and 2030, respectively.

Figure 180: Bar Graph – 2015 Demand versus Capacity by RTPO

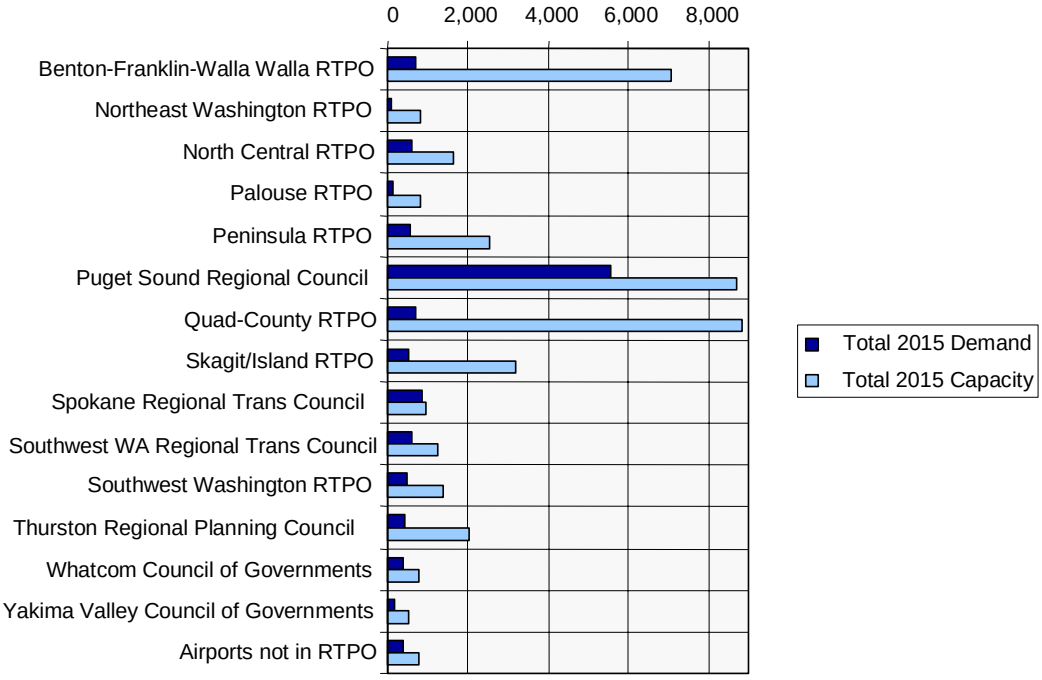
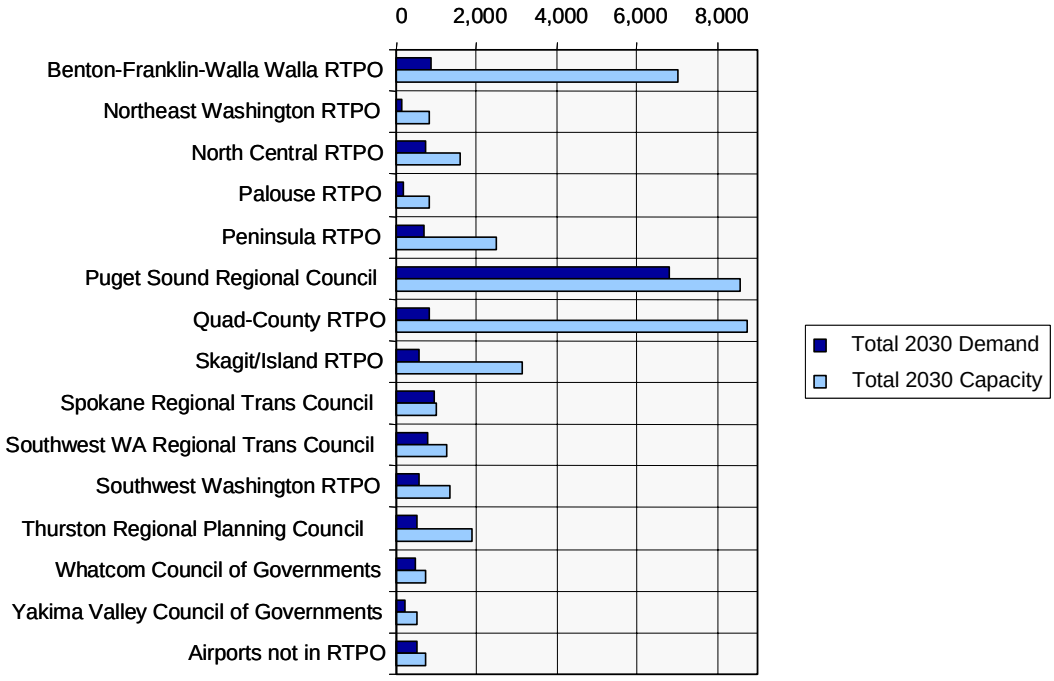


Figure 181: Bar Graph – 2030 Demand versus Capacity by RTPO



Key Findings

Statewide Findings

- As a whole, the Washington State airport system is expected to have adequate long-term aircraft storage capacity. The system is expected to be 29 percent utilized by 2015 and 36 percent utilized by 2030.
- Approximately one-quarter (36 of 139) of Washington State airports are expected to have capacity shortfalls by 2030.

Special Emphasis Region Findings

- Of the four special emphasis regions, two (Spokane and SW Washington) are expected to be nearly 100 percent utilized by 2030.
- While the Puget Sound Region as a whole is not expected to exceed capacity by the year 2030, there are ten airports (36 percent of the total airports in the region) in the region that are expected to be at capacity or exceeding capacity by the year 2030.

- The Southwest Washington Region as a whole is not expected to exceed capacity by the year 2030. Although, five airports (71 percent of the total airports in the region) in the region are expected to be at or exceeding capacity by 2030.

- Three airports (60 percent) in the Spokane Region are expected to be at or exceeding capacity by 2030

RTPO Findings

- There are no RTPO's where the forecast demand is expected to exceed the projected capacity by the year 2030. However, the Spokane Regional Transportation Council RTPO is projected to be 98 percent utilized and the Puget Sound Regional Council is projected to be 80 percent utilized by that time, which are very high utilization levels.

- Of 15 RTPOs, ten are projected to be less than 50 percent utilized by 2030.

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